Space Weather Forecast

Issued on Thursday, 03 August 2023 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 Blackouts likely throughout. Coronal Mass Ejection effects anticipated Days 2-4 (4th-6th Aug) with Minor Storm possible.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate solar activity with occasional Moderate flares, peaking at 02/1452 UTC from the largest and most complex region, located on the southwest of the visible disc. There are currently nine sunspot regions on the disc, with the region in the southwest the most notable. There are two further moderately sized regions which have changed little in recent hours. All other regions are small and simple at the present time. A full-halo Coronal Mass Ejection (CME) was observed leaving the Sun on the 2nd, this is expected to arrive at Earth late on the 5th or early on the 6th. Also, two eruptions late on 31 Jul (and observed on imagery early 01 Aug) are considered to have Earth-directed components arriving on the 4th or 5th.

Solar Wind / Geomagnetic Activity: The solar wind was at mostly low levels below 400 km/s. The total interplanetary magnetic field strength and the all-important north-south component was at weak to moderate levels. Geomagnetic activity was Quiet (Kp 1-2) increasing to Active (Kp4) between 02/0900-1800UTC.
Energetic Particles / Solar Radiation: The observed count rate of energetic particles (high energy protons) was at background levels throughout.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to be Moderate, with a slight chance of High from the complex region on the southwest disc. Other regions contribute to the flare risk, including the returning notable sunspot region now emerging across the southeast limb.
Solar Wind / Geomagnetic Activity: Two CMEs that left the sun late on 31 July and early on 1 Aug are thought to have an Earth-directed component. Glancing blows are considered probable during Day 2 (04 Aug) or less likely Day 3 (05 Aug). A further CME may impact Earth later on day 3 or early day 4 (6th Aug). Solar winds largely remaining at slow-ambient levels, perhaps becoming slightly elevated 400-500km/s late Day 2 or more likely Day 3 due to HSS and potential CME influence. Low confidence in details. Geomagnetic activity is expected to be Quiet to Unsettled (Kp0-3) on day 1 (3rd Aug). From day 2 through to day 4 there is the possibility of CME impacts as well as a CH HSS. Geomagnetic activity likely to becoming Unsettled to Active with a chance of G1/Minor Storm intervals from late Day 2 into Day 4.
Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to remain at background levels. There is a slight chance of further enhancements from any larger flares that occur, mainly from the complex region in the southwest.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	30	30
Strong	G3	No	1	5	5	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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